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Title of the thesis: Some studies of the mixed halides of mercury
in solution and In solid state

ABSTRACT

The main objective of the research work is to find out whether the mixed halides of mercury, what are regarded as HgClBr and HgBrI are actually formed or not. Production of HgBrI and other mixed halides had been claimed for a long time. In this research work, it was tried to produce what is regarded as HgClBr or HgBrI from its components, and to analyse their properties like solubility, molecular weight, catalytic activity, dipole moment etc. X- Ray analyses, FTIR and Raman analyses were also carried out to support the results obtained by the experiments in which we have tried to produce HgClBr (by various methods) and HgBrI . Thus in this present study of the mixed halides of mercury, in the light of the work of Ammlung and Brill in solution, casting very serious doubt on the formation of HgBrI , various methods were employed to see whether HgClBr and HgBrI are formed or not in solid state as well as in many solvents, followed by the study of their properties.

In this study the main work carried out were:

- a) Preparation of HgClBr in three ways from solution and in solid state and to draw conclusions about the formation of a new product from their X-Ray diffractograms by comparing it with the diffractograms of the component di-halides.
- b) FTIR and Raman studies
- c) Electrical conductivity and elucidation of magnetic nature of the mixed and binary halides of mercury.
- d) Study of the ionicity and capacity to agglomerate, of HgClBr.
- e) Effect of impurities on a solid- solid reaction,
- f) The dimension-less quantity $KoVo/Eo$, has been calculated for certain compounds of the element of the Ist and the IInd groups, including the A, B subgroups, with an idea to establish that this quantity provides a parameter that could distinguish between various groups, as also between ionic and non-ionic compounds.

Scope of the work

Thus on the basis of the whole research work, it can be said that, HgClBr, as well as HgBrI exist, in the solid state, as well as in many organic solvents, But its crystal structure determination, and extraction is a long drawn affair. It appears that the new products from the three method of making HgClBr are all different. Characterization of the product will be a crucial step that would be taken in future.